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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,133	12/01/2003	Chang-Hun Lee	8071-42 (OPP 030497US)	2641

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EXAMINER	
CHEN, WEN YING PATTY	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/725,133	LEE ET AL.	
	Examiner	Art Unit	
	Wen-Ying P. Chen	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-37 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-37 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 29 is objected to because of the following informalities: Claim 29 says that the capacitor electrode has triangular shape. It is not clear as to which capacitor claim 29 is referring to, the first capacitor electrode or the second capacitor electrode. For the purpose of examination, the capacitor electrode of claim 29 will be treated to be both the first and second capacitor electrodes. Appropriate correction is required.

Claim 21 is objected to because of the following informalities: Claim 21 reads "a first signal line extending in a fast direction; ...; a third signal line disposed at a fast angle...", which should be changed to "a first signal line extending in a first direction; ...; a third signal line disposed at a first angle...". Appropriate correction is required.

Claim Rejections - 35 USC § 102

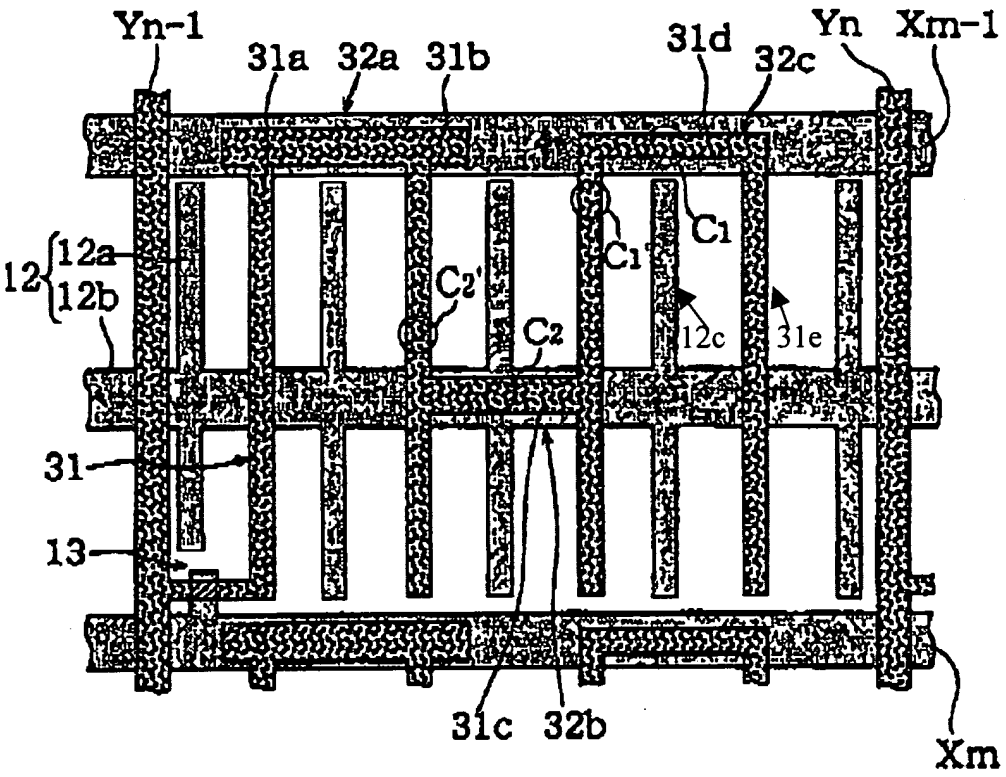
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 9-12, and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiota et al. (US 2002/0154079).

Shiota et al. disclose a liquid crystal display comprising a substrate, as shown in Figure 6, which further constitutes: a first signal line (element Yn-1) formed on the substrate and extending in a first direction; a second signal line (element Xm) intersecting the first direction; a first pixel electrode (element 31a) formed in a pixel area defined by intersections of the first signal line and the second signal line and is formed substantially parallel to the first signal line; a pixel signal line (elements 31b and 31c and 31d) connected to the pixel electrode; a switching element (element 13) connected to the first signal line, the second signal line, and the pixel signal line; a first common electrode (element 12a) formed in the pixel area parallel to the first pixel electrode; a common signal line (element 12b) formed in the pixel area connected to the common electrode; a first capacitor electrode (element 31c) formed in the pixel area connected to the pixel signal line; a second capacitor electrode (line segment of element 12b in region 32b) formed in the pixel area connected to the common signal line; a second pixel electrode (element 31e) and a second common electrode (element 12c) formed in the pixel area opposite to the first pixel electrode with respect to the capacitor electrode and connected to the pixel signal line and the common signal line respectively as shown in the figure below:

Fig. 6



As to claim 2: Shiota et al. disclose in Figure 6 that the pixel signal line (element 31c) overlaps the common signal line (element 32b).

As to claim 3: Shiota et al. disclose in Figure 6 that the common signal line (element 12b) is parallel to the second signal line (element Xm).

As to claim 4: Shiota et al. disclose in Figure 6 that the distance between the common signal line and the second signal line (distance between element 12b and element Xm) is shorter than the distance between the pixel signal line and the switching element (distance between element 31b and element 13).

As to claim 9: Shiota et al. disclose in Figure 6 that the first common electrode (element 12a) is disposed nearer to the first signal line (element Yn-1) than the first pixel electrode (element 31a).

As to claim 10: Shiota et al. disclose in Figure 6 that the second common electrode (element 12c) is disposed nearer to the first signal line (element Yn-1) than the second pixel electrode (element 31e).

As to claims 11 and 12: Shiota et al. disclose in the Abstract that the display comprises a plurality of pixel areas disposed along the direction of the first signal line and that the pixel areas are symmetrical with respect to the second signal line (the pixel areas are in a grid matrix form and being rectangular in shape, therefore, are symmectrical).

As to claim 14: Shiota et al. disclose in Figure 6 that the pixel electrode and the common electrode are disposed on the same planar plane.

As to claim 15: Shiota et al. disclose in Paragraphs 0108 and 0111 that the pixel electrode has a thickness of 0.3μm and that the common electrode has a thickness of 0.2μm, which are less than 2000Å.

As to claim 16: Shiota et al. disclose in Figure 6 that the capacitor electrodes are disposed in a longitudinal center of the pixel area (element 32b).

As to claim 17: Shiota et al. disclose in Figure 6 that the first capacitor electrode is a part of the first pixel electrode.

As to claim 18: Shiota et al. disclose in Figure 6 that the pixel area has a rectangular shape.

As to claim 19: Shiota et al. disclose in Paragraph 0111 that the first signal line is formed of aluminum.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 5-6, 21-27, and 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) in view of Asada et al. (US 5745207).

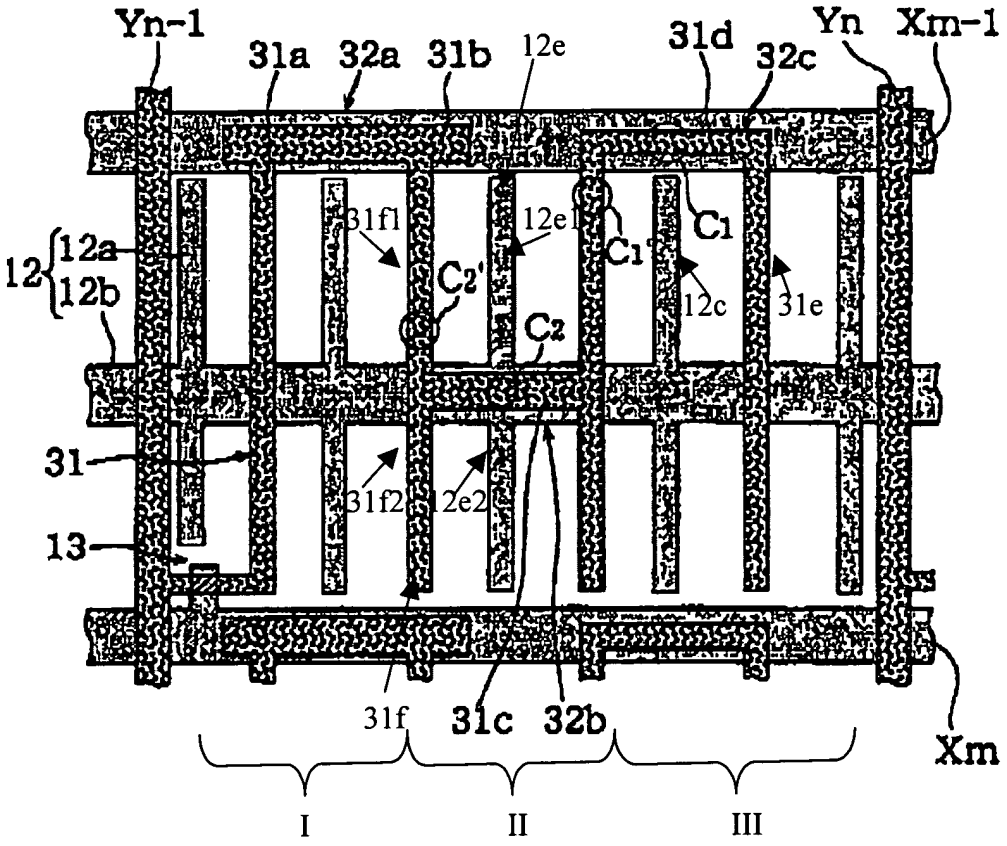
With respect to claims 5 and 6: Shiota et al. disclose all of the limitations set forth in claim 1, but fail to disclose that the first signal line bends at a positive or negative angle. However, Asada et al. disclose in Figure 3 a first signal line (element 3) that bends at an angle with respect to the perpendicular direction of the second signal line (element 1) and with respect to the direction of the rubbing direction (element A) on the substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. wherein the first signal line bends at an angle as taught by Asada et al. since Asada et al. teach by having the first signal line bending at an angle redefines the pixel area, which helps in achieving a wider viewing angle of the display (Column 6, lines 66-67; Column 7, lines 1-5).

As to claim 21: Shiota et al. disclose in Figure 6 a liquid crystal display comprising: a first signal line (element Xm) extending in a first direction; a second signal line (element Xm-1) disposed parallel to the first signal line; a third signal line (element Yn-1) intersecting the first signal line; a fourth signal line (element Yn) intersecting the first signal line; a pixel area having a first part (I), a second part (II), and a third part (III) defined by the first, second, third, and fourth signal lines; a first common electrode (element 12a) and a first pixel electrode (element 31a) extending parallel to the third signal line disposed in the first part of the pixel; a second common electrode (element 12e) having a first line (element 12e1) and a second line (element 12e2) and a second pixel electrode (element 31f) having a third line (element 31f1) and a fourth

line (element 31f2) disposed in the second part of the pixel, wherein the first and third lines are parallel to the third signal line and the second and fourth lines are parallel to the fourth signal line; a first capacitor electrode (region defined by element 32b of element 12b) connected to the common electrode and a second capacitor electrode (element 31c) connected to the pixel electrode disposed in the second part of the pixel area; and a third common electrode (element 12c) and a third pixel electrode (element 31e) extending parallel to the fourth signal line disposed in the third part of the pixel area, as shown in the figure below:

Fig. 6



Shiota et al. fail to disclose that the third and fourth signal lines bend at an angle with respect to the first signal line. However, Asada et al. disclose in Figure 3 a third and fourth

signal lines (element 3) that bend at an angle with respect to the perpendicular direction of the first signal line (element 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. wherein the third and fourth signal lines bend at an angle as taught by Asada et al. since Asada et al. teach by having the third and fourth signal lines bending at an angle redefines the pixel area, which helps in achieving a wider viewing angle of the display (Column 6, lines 66-67; Column 7, lines 1-5).

As to claim 22: Shiota et al. disclose in Figure 6 that the liquid crystal display comprises a switching element (element 13) electrically connected to the pixel electrode.

As to claim 23: Shiota et al. disclose in Figure 6 that the liquid crystal display comprises a pixel signal line (elements 31b, 31c, and 31d) electrically connected to the pixel electrode.

As to claim 24: Shiota et al. disclose in Figure 6 that the liquid crystal display comprises a common signal line (element 12b) electrically connected to the common electrode.

As to claim 25: Shiota et al. disclose in Figure 6 that the common signal line (element 12b) is substantially parallel to the first signal line (element Xm).

As to claim 26: Shiota et al. disclose in Figure 6 that the pixel signal line (element 31c) overlaps the common signal line (element 32b).

As to claim 27: Shiota et al. disclose in Figure 6 that the common signal line (element 12b) is disposed closer to the first signal line (element Xm) than the pixel signal line (element 31b).

As to claim 30: Shiota et al. disclose in Figure 6 that the common electrode (element 12a) adjacent to the switching element (element 13) is disposed nearer to the third signal line (element Yn-1) than the pixel electrode (element 31a).

As to claim 31: Shiota et al. disclose in Figure 6 that the pixel area (elements I and III) is symmetrical with respect to the second capacitor electrode (element 31c).

As to claims 32 and 33: Shiota et al. disclose in the Abstract that the pixel area is symmetrical to the first signal line and that the pixel area is repeated in a row in the perpendicular direction of the first signal line (element Xm; wherein the pixel areas and the signal lines are formed in a grid-like matrix).

As to claim 34: Shiota et al. disclose in Figure 6 that the pixel electrode and the common electrode are disposed on the same plane.

As to claim 35: Shiota et al. disclose in Paragraphs 0108 and 0111 that the pixel electrode has a thickness of 0.3μm and that the common electrode has a thickness of 0.2μm, which are less than 2000Å.

As to claim 36: Shiota et al. disclose in Paragraph 0111 that the third and fourth signal lines are formed of aluminum.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) in view of Wang et al. (US 6201273).

Shiota et al. disclose all of the limitations set forth in claim 1, but fail to disclose that the first and second electrodes are triangular in shape, instead of the disclosed rectangular shape. However, Wang et al. disclose in Figure 8 a capacitor formed in a cylindrical tub shape and teach

in Column 7, lines 35-39 that the capacitor can also be formed in other shapes such as rectangular, square, and triangular depending on the application.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. wherein the capacitor electrodes are in a triangular shape as taught by Wang et al. so that the particular shape of the capacitor electrodes can correspond to the particular shape of the pixel area and the locations of the pixel and common electrodes thus effectively provide capacitance to the pixel area.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) in view of Moia (US 6806930).

Shiota et al. disclose all of the limitations set forth in the previous claims, but fail to disclose that the pixel area is triangular in shape. However, Moia teaches in Column 9, lines 31-37 that the shape of the pixel area can be of rhombic, triangle, hexagonal, or randomly organized arrangements.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. wherein the pixel are is in the shape of a triangle as taught by Moia so that the irregularity of the pixel shape helps to achieve wider viewing angle of the liquid crystal display.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) in view of Moon et al. (US 2002/0044246).

Shiota et al. disclose all of the limitations set forth in the previous claims, but fail to specifically disclose that the first signal line further comprises a pad layer. However, Moon et al. disclose in Figure 6 a liquid crystal display device wherein the first signal line (element 134) comprises of a pad layer (element 124).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. wherein the first signal line further comprises of a pad layer as taught by Moon et al. so that the signal from the driving IC can be provided to the first signal line through the pad layer.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) and Asada et al. (US 5745207) in view of Moia (US 6806930).

Shiota et al. and Asada et al. disclose all of the limitations set forth in claim 21, fail to disclose that the pixel area is trapezoidal in shape. However, Moia teaches in Column 9, lines 31-37 that the shape of the pixel area can be of rhombic, triangle, hexagonal, or randomly organized arrangements.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. and Asada et al. wherein the pixel are is in the shape of a trapezoid as

taught by Moia so that the irregularity of the pixel shape helps to achieve wider viewing angle of the liquid crystal display.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) and Asada et al. (US 5745207) in view of Wang et al. (US 6201273).

Shiota et al. and Asada et al. disclose all of the limitations set forth in claim 21, fail to disclose that the capacitor electrodes are triangular in shape, instead of the disclosed rectangular shape. However, Wang et al. disclose in Figure 8 a capacitor formed in a cylindrical tub shape and teach in Column 7, lines 35-39 that the capacitor can also be formed in other shapes such as rectangular, square, and triangular depending on the application.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. and Asada et al. wherein the capacitor electrodes are in a triangular shape as taught by Wang et al. so that the particular shape of the capacitor electrodes can correspond to the particular shape of the pixel area and the locations of the pixel and common electrodes thus effectively provide capacitance to the pixel area.

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 2002/0154079) and Asada et al. (US 5745207) in view of Moon et al. (US 2002/0044246).

Shiota et al. and Asada et al. disclose all of the limitations set forth in the previous claims, but fail to specifically disclose that the third or fourth signal lines further comprise a pad

layer. However, Moon et al. disclose in Figure 6 a liquid crystal display device wherein the third and fourth signal lines (element 134) comprise of a pad layer (element 124).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display comprising the substrate structure as taught by Shiota et al. and Asada et al. wherein the third and fourth signal lines further comprise of a pad layer as taught by Moon et al. so that the signal from the driving IC can be provided to the third and fourth signal lines through the pad layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wen-Ying P. Chen whose telephone number is (571)272-8444. The examiner can normally be reached on 8:00-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wen-Ying P Chen

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Examiner
Art Unit 2871

WPC
6/23/05